

Respiratory Syncytial Virus Hospitalizations (RSVH) and All-Cause Bronchiolitis Hospitalizations (BH) Among Children Aged ≤24 Months at the Start of the RSV Season With Bronchopulmonary Dysplasia/Chronic Lung Disease of Prematurity (BPD/CLDP) Before and After the 2014 American Academy of Pediatrics (AAP) Policy

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Background

- Respiratory syncytial virus (RSV) disease is a leading cause of hospitalization due to lower respiratory tract infections. However, current treatment options for RSV are primarily supportive^{1,2}
- Palivizumab is the only available immunoprophylaxis (IP) for the prevention of severe RSV infection in high-risk populations, including infants born at ≤35 weeks' gestational age (wGA) and children with chronic lung disease of prematurity (CLDP; formerly bronchopulmonary dysplasia [BPD])^{1,2}
- In 2014, the American Academy of Pediatrics (AAP) stopped endorsing palivizumab for use in children with CLDP born at <32 wGA between the ages of 12 to 24 months not requiring medical support during the 6 months before the start of the RSV season and all children with CLDP born at ≥32 wGA^{1,3}

Objective

- To evaluate the impact of the 2014 AAP policy change on RSV hospitalizations (RSVH) and all-cause bronchiolitis hospitalizations (BH) in children aged ≤24 months with CLDP

Methods

Study Design

- This was a historical, observational cohort study using hospital discharge records from 51 US children's hospitals affiliated with the Pediatric Health Information System (PHIS) database

Patient Selection

- Children with CLDP were eligible if they were aged ≤24 months at the RSV season start and hospitalized for RSV or bronchiolitis during the RSV season (November through March) from 2010 to 2017
- Children with CLDP were classified into two groups with Group 1 including those aged 12 to 24 months (born at <32 wGA) and Group 2 including those aged ≤24 months (born at ≥32 wGA)
- RSVH was defined by International Classification of Diseases, Ninth and Tenth Revisions, Clinical Modification (ICD-9-CM; ICD-10-CM) codes (ICD-9: 079.6, ICD-10: B97.4), pneumonia due to RSV (ICD-9: 480.1, ICD-10: J12.1) or acute bronchiolitis due to RSV (ICD-9: 466.11, ICD-10: J21.0). BH was defined as RSV hospitalizations plus unspecified bronchiolitis hospitalizations (ICD-9: 466.1, 466.19, ICD-10: J21, J21.1, J21.8, J21.9). CLDP was defined by at least one ICD code (ICD-9: 770.7X; ICD-10: P27.0, P27.1, P27.8)

Data Collection and Analysis

- SAS version 9.4 was used for statistical analysis of these data, with chi-squared test or Wilcoxon rank-sum test used to determine statistical significance

Results

- Over the 7 RSV seasons studied (2010-2011 through 2016-2017), a total of 104,687 RSVH and 164,055 BH were identified in the PHIS database. Among RSVH, 1.9% were identified as CLDP. Among BH, 2.4% were identified as CLDP
- Among children with CLDP, hospitalizations for RSV and bronchiolitis were 1.7% (1035/59,217) before 2014 and 2.1% (973 of 45,470) after 2014 ($P<0.0001$) and 2.2% (1941 of 88,054) before 2014 and 2.6% (1992/76,001) after 2014 ($P<0.0001$), respectively
- RSVH rose after the policy change vs before among children with CLDP in both Group 1 (0.4% vs 0.3%; $P=0.0002$) and Group 2 (0.2% vs 0.1%; $P=0.0027$) (Figure 1). Similarly, BH also increased for both Group 1 (0.4% vs 0.3%; $P<0.0001$) and Group 2 (0.2% vs 0.1%; $P=0.0025$) after the policy change vs before
- Intensive care unit (ICU) admissions increased significantly for children with CLDP in both Group 1 (0.1% before the policy and 0.2% after; $P=0.0002$) and Group 2 (0.06% before the policy and 0.13% after; $P=0.0007$). Receipt of mechanical ventilation (MV) also increased for both groups ($P=0.0029$ for Group 1; $P=0.0410$ for Group 2) (Figures 2 and 3). Similar results were observed for BH

Figure 1. Proportion of RSVH and BH Among Children With CLDP by Subgroup Before and After the 2014 AAP Policy Change

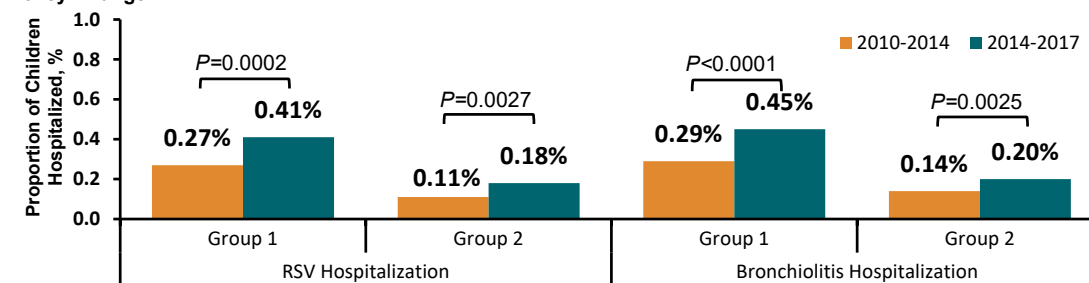


Figure 2. RSV Hospitalization Disease Severity (ICU Admission and MV Receipt) Among Children With CLDP Aged 12-24 Months (Born at <32wGA) Before and After the 2014 AAP Policy Change (Group 1)

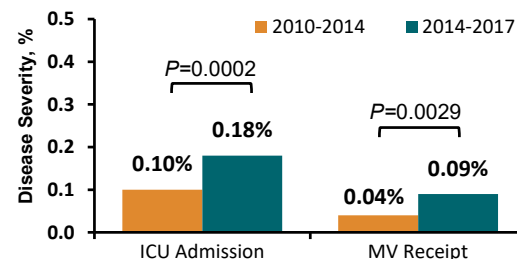
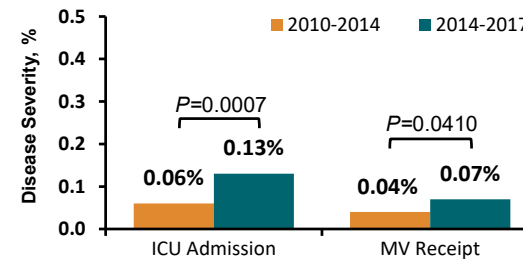


Figure 3. RSV Hospitalization Disease Severity (ICU Admission and MV Receipt) Among Children With CLDP Aged ≤24 Months (Born at ≥32 wGA) Before and After the 2014 AAP Policy Change (Group 2)



Limitations

- As with any observational retrospective cohort, causal associations cannot be established and the results may not be generalizable to the overall population
- The CLDP group of children born at less than 32 wGA and aged 12-24 months may be an over-representation of those patients because medical support in the last 6 months and the requirement of >21% oxygen for the first 28 days after birth could not be determined based on the available dataset
- Potential coding errors and inconsistencies may underestimate or overestimate severe RSV disease

Conclusions

This analysis highlights the increase in RSVH, BH, and associated severity among BPD/CLDP subgroups within the PHIS after the 2014 AAP policy change

Future Directions

Further study of long-term complications associated with RSVH in these children is warranted in addition to continued examinations of the impacts from the 2014 AAP policy recommendations on RSV IP

References

- American Academy of Pediatrics Committee on Infectious Diseases; American Academy of Pediatrics Bronchiolitis Guidelines Committee. *Pediatrics*. 2014;134(2):e620-e638.
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